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Studies on Colibacillosis in Calves in Egypt

II. Incidence of E. coli Serogroups among Live Calves

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With 2 tables

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Introduction

In a previous article the authors emphasized the importance of *E. coli* as a cause of death among calves (FARID et al., 1975). Enteritis was found to cause a mortality rate ranging between 27.4 % and 55.5 % of the total deaths in buffalo calves and 22.0 % to 42.0 % in Friesian calves. From the internal organs of 62 dead calves 16 different *E. coli* serogroups could be isolated. These were O 111, O 115, O 35, O 137, O 78, O 9, O 101, O 8, O 26, O 86, O 55, O 119, O 11, O 15, O 12Ä and O 126.

The present work was undertaken to study the prevalence of colibacillosis among live buffalo and Friesian calves in Egypt. For this purpose intensive breeding farms belonging to the General Meat Organization were selected for the investigation. As these farms are scattered in the different provinces extending from Alexandria to Aswan, the serological identification of the isolated *E. coli* might provide a general indication of the *E. coli* serogroups prevailing in Egypt.

Material and Methods

1178 faecal samples were collected from the rectum of calves belonging to calf-rearing units, buffalo dairy farms, buffalo markets and Friesian dairy farms. The samples were cultured on different media. The bacterial strains isolated which proved to be *E. coli* on the basis of their biochemical characteristics were typed serologically using diagnostic sera obtained from the Wellcome Research Laboratories, U. .K, and the Institute Merieux International, France, as well as sera prepared locally.

Results

From 1178 faecal samples collected from 956 buffalo and 222 Friesian calves on farms with problems of enteritis, 951 *E. coli* strains were isolated.

The incidence in buffalo and Friesian calves was almost the same, namely 80.8 % and 80.6 %, respectively. The animals were from 22 farms and 5 markets distributed in 12 provinces in Upper and Lower Egypt. The percentage of isolation was very similar on all the premises.

Table 1

Incidence of pathogenic *E. coli* serogroups in some living calves in different areas in Egypt

Origin	Number of animals examined	Number of + ve cases	Number of typed strains	Rough strains	Untyped strains
Buffalo calf rearing units	165	132	80	10	42
Buffalo dairy farms	441	351	261	22	68
Market buffalo calves	350	289	261	6	22
Friesian dairy farms	222	179	154	8	17
Total	1178	951 (80.7 %)	756 (79.5 %)	46 (4.8 %)	149 (15.7 %)

756 strains (79.5 %) could be typed serologically with the available antisera; 46 strains (4.8 %) were rough and 149 (15.7 %) could not be typed (Table 1). Variations in the incidence of the various *E. coli* groups were observed on the different units and farms. In buffalo calf-rearing units the common *E. coli* groups were 117, 137, 8, and 35; while in market buffalo calves the order of frequency was O 117, O 35, O 101, O 115 and O 137; O-groups 78, 9, 8, 119 and 126 were less frequent and O-groups 15, 26, 111 and 125 were isolated only once. In buffalo calves from dairy farms the frequency of *E. coli* sero-groups in descending order was 117, 35, 9, 101, 115, 137, 8, 15, 78, 119, 26, 86, 55, 111, and 126. In Friesian calves the isolated O-groups were 117, 9, 101, 35, 8, 115, 137, 78, 15, 26 and 126 (Table 2).

Discussion

In this study O-groups 117 was by far the most frequently isolated sero-group from the faeces of live calves. It was also predominantly isolated from the internal organs of dead calves, especially buffalo calves (FARID et al., 1975). This finding is important because this O-group occupied mostly the third, fourth and even the eighth and twelfth places in the list of *E. coli* isolated in other countries (WRAMBY, 1948; SAKAZAKI and NAMIOKA, 1956; FEY, 1957; REES, 1958; DAM, 1960; ULENDEEV, 1963; YALCIN et al., 1969 and GLANTZ, 1971). On the other hand O 8 and O 9 were reported by many authors to be the most common *E. coli* groups in calves (INGRAM et al., 1953; ULBRICH, 1954; WOOD, 1955; GOSSLING et al., 1964 and PIGNATTELLI et al., 1972). In Egypt, these two O-groups were less frequent. Similarly, O-group 78 which is considered to be the most important O-group in Europe (BOKHARI and ØRSKOV, 1952; FEY, 1957 and 1972) occupied the 7th place among *E. coli* isolated in this study; however, FARID et al. (1975) reported that O 78 was the most common among Friesian calves dead of colibacillosis. They could also isolate it from the cerebrospinal fluid of a calf that showed nervous symptoms.

O-groups 26, 55, 86, 111, 119, 125 and 126 which are known to be common causes of enteritis in infants (EDWARDS and EWING, 1962; WILSON and MILES, 1964 and REFAI and ROHDE, 1965) were also isolated from calves but in small numbers.

Table 2

No. of *E. coli* serogroups isolated from live calves

Farms \ O groups	8	9	15	26	35	55
Calf rearing units	12	2	1	1	8	-
Buffalo markets	10	11	1	1	48	-
Buffalo dairy farms	17	26	16	3	36	2
Friesian farms	15	23	5	3	16	-
Total	54	62	23	8	108	2

It is interesting to note that on some dairy farms 12 different O-groups were encountered whereas on other farms there were only 4 O-groups. In the first case the calves were bought from different markets belonging to different provinces, while in the second the calves were born on the farm.

Although these studies were carried out on special farms belonging to the General Meat Organization, the results obtained may be helpful as a basis for a map illustrating the incidence and frequency of *E. coli* serogroups most prevalent in Egypt. This has the practical value of indicating which serogroups should be involved in the preparation of vaccines.

Summary

Bacteriological examination of 1178 faecal samples from living buffalo and Friesian calves on 22 different farms and markets was carried out. 951 *E. coli* strains were isolated, representing a percentage of 80.7 %, from which 756 (79.5 %) strains were typed, 146 were rough (4.8 %), and 149 (15.7 %) could not be typed with the available antisera. The O-groups identified were (in decreasing order of frequency) O 117, O 35, O 115, O 137, O 101, O 9, O 8, O 15, O 26, O 119, O 86, O 111, O 126 and O 125.

Zusammenfassung

Untersuchungen über die Colibazillose der Kälber in Ägypten

II. Die Verbreitung von E. coli-Serogruppen unter lebenden Kälbern

1178 Fäzesproben von lebenden Büffel- und Friesiankälbern aus 22 verschiedenen Farmen und Märkten wurden bakteriologisch untersucht. Dabei wurden 951 *E.coli*-Stämme, dies entspricht einem Anteil von 80,7 %, isoliert. Von diesen Stämmen konnten 756 (79,5 %) typisiert werden. 146 Stämme (4,8 %) waren Rauh-Formen und 149 (15,7 %) ließen sich mit den verfügbaren Antisera nicht identifizieren. Folgende O-Gruppen wurden dabei gefunden (mit abnehmender Häufigkeit): O 117, O 35, O 115, O 137, O 101, O 9, O 8, O 15, O 26, O 119, O 86, O 111, O 126 und O 125.

Résumé

Recherches sur la colibacillose des veaux en Egypte

II. Répartition des groupes sérologiques de E. coli chez des veaux vivants

1178 échantillons de fèces de veaux vivants (buffles et frisons) provenant de 22 exploitations et marchés différents on été examinés bactériologiquement. On a isolé 951 souches d'*E. coli* représentant le 80,7 %. 756 souches (79,5 %) ont pu être typisées. 46 souches (4,8 %) étaient de forme R et 149 (15,7 %) souches n'ont pu être typisées avec les antisérums disponibles. Les groupes O

Table 2

belonging to different farms and some markets

78	86	101	111	115	117	119	125	126	137	Rough	Untyped	Total
6	-	7	2	5	20	2	-	-	14	10	42	132
16	-	26	1	26	88	3	1	3	26	6	22	289
16	3	23	2	23	66	5	-	2	21	22	68	351
14	-	21	-	15	26	-	-	1	15	8	17	179
52	3	77	5	69	200	10	1	6	76	46	149	951

suivants furent trouvés (par ordre décroissant de fréquence): O 117, O 35, O 115, O 137, O 101, O 9, O 8, O 15, O 26, O 119, O 86, O 111, O 126 et O 125.

Resumen

Estudios sobre la colibacilosis de los terneros en Egipto
II. Difusión de serogrupos E. coli entre terneros vivos

Se examinaron bacteriológicamente 1178 muestras fecales de terneros vivos de búfalas y vacas frisonas de 22 explotaciones y mercados diferentes. Así se aislaron 951 estirpes *E. coli*, lo que corresponde a la proporción de 80,7 %. De estas estirpes se pudieron tipificar 756 (79,5 %). 46 cepas (4,8 %) eran formas rugosas y 149 (15,7 %) no se pudieron identificar con los antisueros disponibles. Los grupos O hallados fueron los siguientes (con frecuencia decreciente): O 117, O 35, O 115, O 137, O 101, O 9, O 8, O 15, O 26, O 119, O 86, O 111, O 126 y O 125.

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